

Notice of Allowability

Application No.

10/816,332

Examiner

Jaworski Francis J.

Applicant(s)

DEMERS

Art Unit

3768

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Interview 9/12/06.
2. ☒ The allowed claim(s) is/are 1-9 and 11-17.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

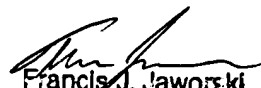
Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413),
Paper No./Mail Date (same)
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


Francis J. Jaworski
Primary Examiner

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Brinton Yorks on September 12, 2006.

The application has been amended as follows, by replacing the existing claims with the amended set:

1. (currently amended) A method for medical ultrasound imaging, comprising:

acquiring ultrasound image data representative of three-dimensional volume segments of an image volume in synchronism with cardiac cycles of a subject, each of the volume segments containing image data distributed in three dimensions which is acquired during a cardiac cycle of the subject;

acquiring ECG waveforms of the cardiac cycles during which the volume segments are acquired;

combining the image data representative of the volume segments to provide image data representative of a three-dimensional ultrasound image of the image volume; and

displaying the ECG waveforms in a comparative display in which the uniformity of the waveforms is illustrated in association with the volume segments to which each of the ECG waveforms corresponds.

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2. (original) The method of Claim 1, further comprising displaying the three-dimensional ultrasound image of the image volume concurrently with the comparative display of ECG waveforms.

3. (original) The method of Claim 1, wherein displaying the ECG waveforms in a comparative display comprises displaying the ECG waveforms in separate lines in which the waveforms are vertically aligned by their R-waves.

4. (original) The method of Claim 3, wherein displaying the ECG waveforms in a comparative display further comprises displaying the ECG waveforms in different visually distinctive ways.

5. (original) The method of Claim 4, wherein displaying the ECG waveforms in different visually distinctive ways comprises displaying the ECG waveforms in different shadings.

6. (original) The method of Claim 4, wherein displaying the ECG waveforms in different visually distinctive ways comprises displaying the ECG waveforms in different colors.

7. (original) The method of Claim 1, wherein displaying the ECG waveforms in a comparative display comprises displaying the ECG waveforms in overlapping alignment.

8. (previously presented) The method of Claim 1, wherein displaying the ECG waveforms in a comparative display further comprises displaying the ECG waveforms in different colors.

9. (previously presented) A method for medical ultrasound imaging, comprising:

acquiring ultrasound image data representative of three-dimensional volume segments of an image volume in synchronism with cardiac cycles of a subject, each of the volume segments containing image data distributed in three dimensions which is acquired during a cardiac cycle of the subject;

acquiring ECG waveforms of the cardiac cycles during which the volume segments are acquired;

comparing the ECG waveforms;

reacquiring the ultrasound image data of a volume segment having an ECG waveform which is dissimilar from the ECG waveforms of other volume segments;

combining the image data representative of the volume segments to provide image data representative of a three-dimensional ultrasound image of the image volume; and

displaying a three-dimensional ultrasound image of the image volume.

10. (canceled)

11. (currently amended) A medical diagnostic ultrasound imaging system comprising:

a transducer comprising an array of transducer elements;

a transmitter for transmitting ultrasound energy with said transducer into volume segments of an image volume of interest in a subject as a plurality of transmit beams;

a receiver for receiving ultrasound echoes with said transducer from the image volume in response to the ultrasound energy and for generating received signals representative of the received ultrasound echoes;

a receive beamformer for processing said received signals to form at least one receive beam for each of the transmit beams and to generate image data representative of the ultrasound echoes in the receive beam;

an image memory which stores the image data of a plurality of volume segments;

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an ECG device coupled to the subject for generating an ECG signal representative of the cardiac cycle during reception of echoes from a volume segment; and

a display for displaying an image volume and the ECG signals of the volume segments of the image volume in a comparative display in which each volume segment is associated with the ECG signal of the cardiac cycle occurring during the reception of echoes from that volume segment.

12. (previously presented) The medical diagnostic ultrasound imaging system of Claim 11, wherein the display further comprises a display of the ECG signals of the volume segments which are in vertical alignment.

13. (previously presented) The medical diagnostic ultrasound imaging system of Claim 12, wherein the display further comprises a display of the ECG signals of the volume segments which are vertically aligned by their R-waves.

14. (previously presented) The medical diagnostic ultrasound imaging system of Claim 11, wherein the display further comprises a display of the ECG signals of the volume segments in different colors.

15. (previously presented) The medical diagnostic ultrasound imaging system of Claim 12, wherein the display further comprises a display of the ECG signals of the volume segments in different colors.

16. (previously presented) The medical diagnostic ultrasound imaging system of Claim 11, wherein the display further comprises a display of the ECG signals of the volume segments in overlapping alignment.

17. (previously presented) The medical diagnostic ultrasound imaging system of Claim 16, wherein the display further comprises a display of the ECG signals of the volume segments in different colors.

The following is an examiner's statement of reasons for allowance:

In addition to the cited art, Newman (US6544175) cols. 5 – 6 bridging is directed to acquisition of volume subsets or segments in three-dimensions however Newman does not produce an ECG wave comparison format with re-acquisition based upon a comparison but rather applies corrective interpolations to existing volume segment data. Additionally, none of the prior art of record teaches or suggests volume-segment based ultrasound three-dimensional scanning with concurrent comparative ECG display of the associated respective ECG waves during which each volume segment was obtained.

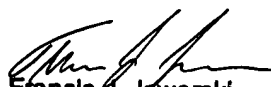
Steen (US2005/009~~X~~⁴07~~0~~⁵) of ineffective date has been cited to complete the record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication should be directed to Jaworski Francis J. at telephone number 571-272-4738.

FJJ:fjj

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Francis J. Jaworski
Primary Examiner